

REMARKS

The claims now pending in the application are Claims 1 to 12, the independent claims being Claims 1 and 9. Claims 7, 8 and 12 have been cancelled herein. Claims 1 to 6 and 9 to 11 have been amended herein.

In the Official Action dated July 1, 2003, Claims 1 to 12 were rejected under 35 U.S.C. § 102(b), as anticipated by U.S. Patent No. 5,047,847 (Toda). Reconsideration and withdrawal of the rejection respectfully are requested in view of the above amendments and the following remarks.

The rejection of the claims over the cited art respectfully is traversed. Nevertheless, without conceding the propriety of the rejection, Claims 7, 8 and 12 have been cancelled, and Claims 1 to 6 and 9 to 11 have been amended herein more clearly to recite various novel features of the present invention, with particular attention to the Examiner's comments. Support for the proposed amendments may be found in the original application. No new matter has been added.

The present invention relates to a novel camera. In one aspect, as now recited in independent Claim 1, the present invention relates to a camera having a physical element, arranged in a photographing optical system, that can change a light transmission factor thereof. Photoelectric conversion means, having a plurality of pixels, receives an optical image transmitted through the physical element at a position of an imaging plane and converts the optical image into electrical image signals for plural colors, respectively. Memory means stores correcting information for correcting an output level change of the electrical image signals of the respective plural colors from the photoelectrical conversion

means, caused by a change in an optical characteristic of the physical element with respect to a change of the light transmission factor of the physical element. Correction means corrects at least one of the electrical image signals for the respective plural colors using the correcting information read out from the memory means in accordance with the current light transmission factor of the physical element, white-balance adjusting means adjusts a white balance in the electrical image signals from the respective plural colors, in accordance with the electrical image signals for the respective plural colors corrected by the correction means, and control means controls drive of the physical element in accordance with an output from the white-balance adjusting means.

In a similar aspect, as now recited in independent Claim 9, the present invention relates to a camera comprising a physical element capable of changing a light transmission factor thereof. Photoelectric conversion means, having a plurality of pixels, receives an optical image transmitted through the physical element at a position of an imaging plane, and converts the optical image into electrical image signals for plural colors, respectively, the plurality of pixels being adjustable for at least one of sensitivity and light accumulation time thereof. Memory means stores correcting information for correcting an output level change of the photoelectric conversion means, caused by a change in an optical characteristic of the physical element with respect to a change of the light transmission factor of the physical element, the correcting information including at least two correcting information factors. Correcting means corrects the electrical image signals for the respective plural colors output from the photoelectric conversion means, using the correction information read out from the memory means in accordance with the

current light transmission factor of the physical element. White-balance adjusting means adjusts a white balance in the electrical image signals for the respective plural colors, in accordance with the electrical image signals for the respective plural colors corrected by the correction means. Exposure amount adjustment means controls the exposure amount by a combination of adjusting at least one of the light transmission factor and the light transmission amount of the physical element, and adjusts at least one of the light accumulation time and the sensitivity of the photoelectric conversion means, in accordance with the output from the white-balance adjusting means.

Amended independent Claims 1 and 9 each recite that a camera of the present invention stores in memory correction information for correcting an output level change of photoelectric conversion means caused by a change in an optical characteristic of a physical element within a photographing optical system, with respect to a change of light transmission factor of the physical element, and corrects image signals for respective plural colors output from the photoelectric conversion means, using the correction information which is read out from the memory, in accordance with a current light transmission factor of the physical element. As shown in Fig. 5, by way of example, in one embodiment the present invention uses correction information stored in an LUT 41 to correct a level of an output of an image pickup element 10 using a multiplier 36 and reads out such correction information from the LUT 41 in accordance with a current light transmission factor of a physical element (i.e., a drive voltage currently applied from a drive control circuit 42 to the physical element 9EC; see, e.g., page 20, lines 9 to 14, page 22, lines 17 to 22 and page 24, lines 2 to 4). Claims 1 and 9 have been amended herein to recite more clearly that

image signals R, G, B respectively output from a CCD before white-balance adjustment are corrected using correction information (correction factors according to transmission changes for the respective plural colors) (i) directly, (ii) after changing the pixel sensitivity, and/or (iii) after changing the light accumulation time of the pixels; thereafter, white-balance adjustment is performed.

Applicant submits that the prior art fails to anticipate the present invention. Moreover, Applicant submits that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Toda '847 patent relates to an endoscope using liquid crystal devices different in response frequency in an image forming optical system, and discloses an image forming system including a liquid crystal assembly consisting of a plurality of liquid crystals. However, Applicant submits that the Toda '847 patent fails to disclose or suggest at least the above-discussed features of the present invention.

The Examiner refers to Fig. 45 of the Toda '847 patent and asserts that the claims can be read on a control structure of a physical element 412 shown therein. This control structure includes a memory 438, an integrator 434, a CPU 437 and a drive circuit 439.

The memory 438 stores a drive voltage of an LC iris 412, corresponding to an iris value obtained from an output of the integrator 434 (see, col. 30, lines 47 to 56); accordingly, Applicant submits that the Toda '847 patent fails to teach the memory means recited in amended independent Claims 1 and 9. As described above, the correction

information of the present invention is level correction data for correcting an output level change of the electrical image signals of the respective plural colors from the photoelectric conversion means, and includes at least two correction information factors in accordance with the changed light transmission factor.

In addition, the data stored in the memory 438 is read out in accordance with the output of the integrator 434 to provide the drive voltage to be supplied to the LC iris 412. This is in sharp contrast to the correction means, white-balance adjustment means and control means recited in amended independent Claims 1 and 9. The claimed invention includes the feature of reading out the correction information from the memory 41 for correcting the output level change of the electrical image signals of the respective plural colors, in accordance with the drive voltage currently supplied from the drive control circuit 42 to the physical element 9EC, to attain the "current light transmission factor" of the physical element.

Thus, Applicant submits the Toda '847 patent fails to disclose or suggest at least the combined features of memory means, correction means, white-balance adjusting means and control means, functioning together, as disclosed and claimed in the present application (Claims 1 and 9).

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein.

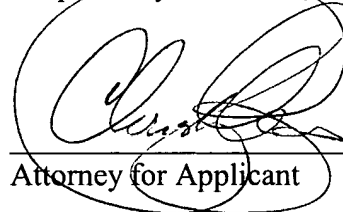
For the above reasons, Applicant submits that independent Claims 1 and 9 are allowable over the cited art.

Claims 2 to 8 and 10 to 12 depend from Claims 1 and 9, respectively, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Applicant believes that the present Amendment is fully responsive to each of the points raised by the Examiner in the Official Action, and submits that the application is in allowable form. Favorable consideration of the claims and passage to issue of the present Application at the Examiner's earliest convenience earnestly are solicited.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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